

# *Graphing Functions*

## *Unit 15.5*

Day	Section	Topic	Assignment
1	4.4	Graphing Polynomial Functions	<b>Pg 311-312:</b> 1-8, 21-28
2	4.5	Finding Asymptotes	<b>Pg 326:</b> 1-8, 15-22 Finding Asymptotes Wksht
3	4.5	Graphing Rational Functions	<b>Pg 327-8:</b> 25, 26-40 (even)
4	4.5	Rational Functions – Equations from a Graph	<b>Graphing Rational Functions Wkst (3 sides)</b> <b>Pg 328:</b> 41-46 (all)
5		Review	<b>Pg 339-340:</b> 34, 35, 40-49, 57, 58, 60-67
6	TEST Unit 15.5		

DAY 1 Pg 311-312: 1-8, 21-28

1) A                      2) B                      3) 1 real zero    4) C

5) B and D    6) B                      7)  $f(x) = x(x+5)^2(x-3)$

8)  $f(x) = -(x+6)(x+1)^2(x-3)(x-5)$

21-28 → SEE DESMOS.COM

DAY 2 Pg 326: 1-8, 15-22, Finding Asymptotes Wksht

1) A, B, C                      2) B                      3) A                      4) C and D

5) A                      6)  $(-\infty, 3) \cup (3, \infty)$                       7) A, C, D                      8) C

15) VERTICAL ASYMPTOTE:  $x = 5$ , HORIZONTAL ASYMPTOTE:  $y = 0$

16) VERTICAL ASYMPTOTE:  $x = -9$ , HORIZONTAL ASYMPTOTE:  $y = 0$

17) VERTICAL ASYMPTOTE:  $x = -1/2$ ,  
HORIZONTAL ASYMPTOTE:  $y = -3/2$

18) VERTICAL ASYMPTOTE:  $x = 4$ , HORIZONTAL ASYMPTOTE:  $y = 2$

19) VERTICAL ASYMPTOTE:  $x = -3$ , OBLIQUE ASYMPTOTE:  $y = x - 3$

20) VERTICAL ASYMPTOTE:  $x = 1$ , OBLIQUE ASYMPTOTE:  $y = x + 1$

21) VERTICAL ASYMPTOTE:  $x = -2$ ,  $x = 5/2$ ,  
HORIZONTAL ASYMPTOTE:  $y = 1/2$

22) VERTICAL ASYMPTOTE:  $x = 1/5, x = 5$ ,  
HORIZONTAL ASYMPTOTE:  $y = 3/5$

Finding Asymptotes Worksheet

- |                       |                       |
|-----------------------|-----------------------|
| 1) VA: $x = -4$       | HA: $y = 3$           |
| 2) VA: $x = 6$        | HA: $y = 3$           |
| 3) VA: NONE           | HA: NONE              |
| 4) VA: $x = -5$       | HA: $y = -x + 5$      |
| 5) VA: $x = 1, -1$    | HA: $y = 0$           |
| 6) VA: $x = 1$        | HA: $y = \text{NONE}$ |
| 7) VA: $x = 0$        | HA: $y = 0$           |
| 8) VA: $x = 0, -2$    | HA: $y = 0$           |
| 9) VA: $x = 0$        | HA: $y = 3x$          |
| 10) VA: $x = 2, -1/3$ | HA: $y = 2$           |
| 11) VA: $x = 0$       | HA: $y = -x - 1$      |
| 12) VA: $x = -1, 0$   | HA: $y = 0$           |

DAY 3 Pg 327-8: 25, 26-40 (even)

25) a) C                      b) A                      c) B                      d) D

26) a) The oblique asymptote is  $y = x + 1$ .

b) The function crosses the oblique asymptote at  $x = 0$  and  $x = 1$ .

c) As  $x$  approaches infinity the function approaches the oblique asymptote from above.

28 – 40 (even) in DESMOS.COM

DAY 4 Pg 328: 41-46 (all)

$$41) f(x) = \frac{(x-3)(x+2)}{(x-2)(x+2)}$$

$$42) f(x) = \frac{2x(x+4)}{(x+2)^2}$$

$$43) f(x) = \frac{(x-2)}{x(x-4)}$$

$$44) f(x) = \frac{-4}{x^2 + 1}$$

45) SEVERAL ANSWERS POSSIBLE

$$f(x) = \frac{(x-3)(x+1)}{(x-1)^2}$$

46) SEVERAL ANSWERS POSSIBLE

$$f(x) = \frac{(x-1)(x-3)}{x(x-2)}$$

## Graphing Rational Functions Wkst : 1-6 DESMOS

$$1) f(x) = \frac{(x-3)(x+2)}{x(x-3)}$$

$$2) f(x) = \frac{(x-2)}{x(x-4)}$$

$$3) f(x) = \frac{(x+2)}{(x+3)(x-1)}$$

$$4) f(x) = \frac{(x-1)^2}{(x+1)^2}$$

Day 5: Pg 339-340: 34, 35, 40-49, 57, 58, 60-67

34) ANSWERS VARY

35) ANSWERS VARY

40) 2      41) 3      42) C      43) D

44) E      45) A      46) B      47) F

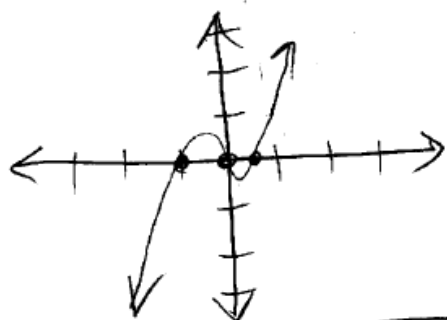
48) a)  $(-\infty, \infty)$    b)  $(-\infty, \infty)$    c) down on left, up on right   d) max 7   e) max 6

49) a)  $(-\infty, \infty)$    b)  $(-\infty, \max]$    c) down on L, down on R   d) max 6   e) max 5

57)  $f(x) = 2x^3 + x^2 - x$

$f(x) = x(2x^2 + x - 1)$

$f(x) = x(2x-1)(x+1)$



58)  $f(x) = x^4 - 3x^2 + 2$

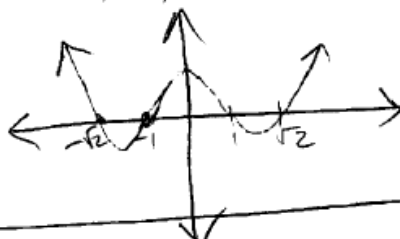
$f(x) = (x-1)(x^3 + x^2 - 2x - 2)$

$f(x) = (x-1)[x^2(x+1) - 2(x+1)]$

$f(x) = (x-1)(x+1)(x^2 - 2)$

$x = 1, -1, \pm\sqrt{2}$

$f(0) = 2$



60)  $f(x) = \frac{4}{x-1}$

VA  $x=1$

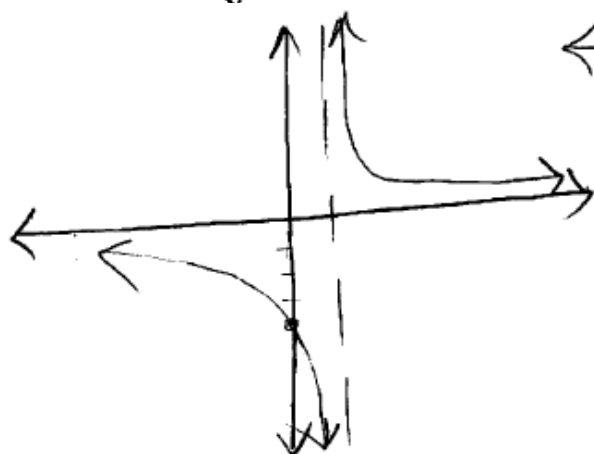
HA  $x=0$

cross?  $0 = \frac{4}{x-1}$   
No  $0 \neq 4$

$x-1$

$x$ -int None

$y$ -int  $y=-4$   
(0, -4)



⑥1  $f(x) = \frac{4x-2}{3x+1}$

VA  $x = -\frac{1}{3}$

HA  $y = \frac{4}{3}$

Cross?  $\frac{4}{3} = \frac{4x-2}{3x+1}$

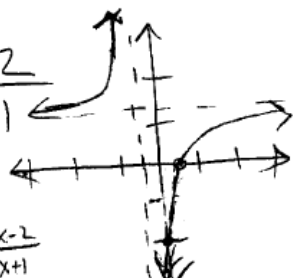
$12x+4 = 12x-6$

No

X-int  
 $0 = 4x-2$   
 $x = \frac{1}{2}$

Y-int  
 $f(0) = -2$   
 $(0, -2)$

$f(-1) = \frac{-4-2}{-3+1} = \frac{-6}{-2} = 3$   
 $(-1, 3)$



⑥2  $f(x) = \frac{6x}{(x-1)(x+2)}$  unint. Dens. Cont.

VA  $x = -1, x = -2$

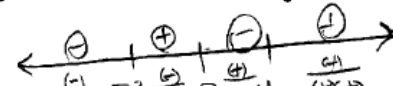
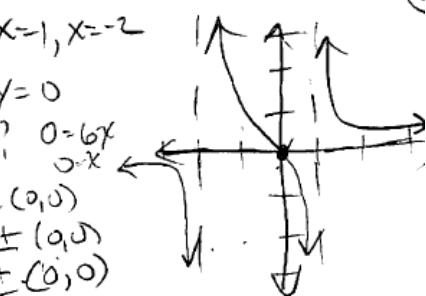
HA  $y = 0$

Cross?  $0 = \frac{6x}{(x-1)(x+2)}$

Yes @  $(0, 0)$

X-int  $(0, 0)$

Y-int  $(0, 0)$



⑥3  $f(x) = \frac{2x}{x^2-1}$

VA  $x = \pm 1$

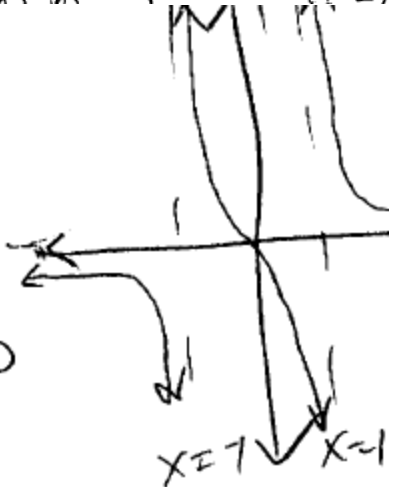
HA  $y = 0$

Cross?  $0 = 2x$

Yes @  $(0, 0)$

X-int  $(0, 0)$

Y-int  $f(0) = 0$   
 $(0, 0)$



$\frac{2x}{(x-1)(x+1)}$

-	+	-	+
$(-\infty, -1)$	$(-1, 0)$	$(0, 1)$	$(1, \infty)$
-	+	-	+

$f(-2) = -\frac{4}{3}, f(-\frac{1}{2}) = \frac{4}{3}, f(\frac{1}{2}) = -\frac{4}{3}$

(64)  $f(x) = \frac{x^2+4}{x+2}$

VA  $x = -2$

HA  $-2 \overline{) 104}$   
 $\underline{-24}$   
 $1-28$

$f(0) = 2$   
 $(0, 2)$

$y = x - 2$

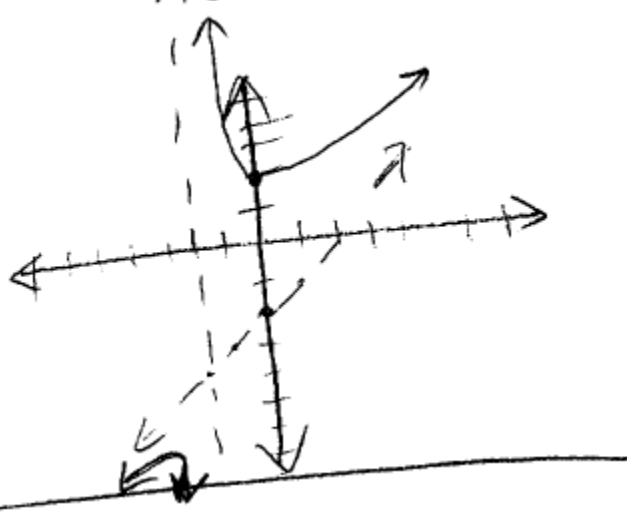
$f(3) = \frac{9+4}{-1}$

Cross?  $x-2 = \frac{x^2+4}{x+2}$

$x^2-4 \neq x+4$

$f(-3) = -7$

No



(65)  $f(x) = \frac{x^2-1}{x}$

VA  $x = 0$

X-int

HA  $x \overline{) x^2+1}$   
 $\underline{x^2}$   
 $1$

$0 = x^2 + 1$

$x = \pm 1$

$(1, 0), (-1, 0)$

$y = x$

Y-int

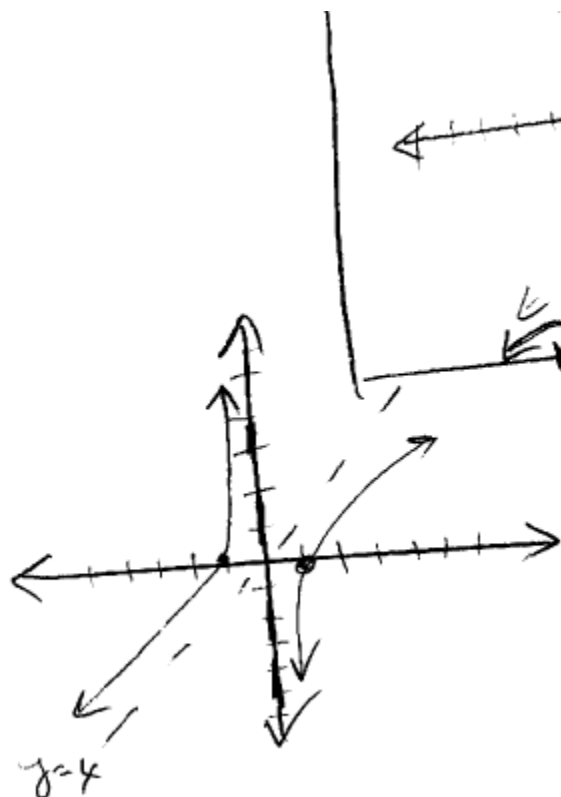
$f(0) = \phi$

None

Cross?  $x = \frac{x^2-1}{x}$

$x^2 \neq x^2 - 1$

No



$$(66) f(x) = \frac{-2}{x^2+1}$$

$$x^2 = -1$$

VA None

Xint None

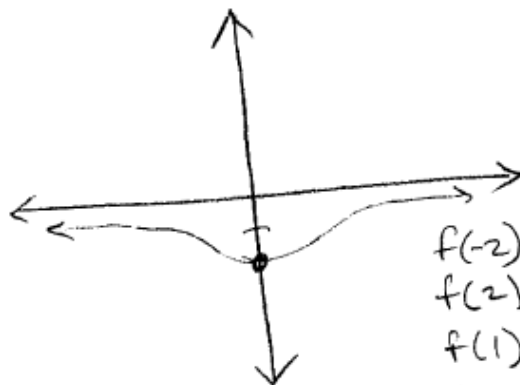
HA  $y=0$

Yint  $f(0) = -2$   
(0, -2)

$$\text{red } 0 = \frac{-2}{x^2+1}$$

$$0 \neq -2$$

No



$$f(-2) = -\frac{2}{5}$$

$$f(2) = -\frac{2}{5}$$

$$f(1) = -1$$

$$f(-1) = -1$$

$$(67) f(x) = \frac{4x^2-9}{2x+3} = \frac{(2x-3)(2x+3)}{2x+3}$$

VA  $x = -\frac{3}{2}$

HA After cancelling,  
No longer rational,  
Graph  $y = 2x - 3$  w/ hole

$$f\left(-\frac{3}{2}\right) = 2\left(-\frac{3}{2}\right) - 3$$

$$= -6$$

